

**CLAIMS (first time amended) :**

1. **(currently amended)** A method of identifying and detecting channels in a multiplexed communications network, comprising the steps of:

modulating each channel to be identified with a respective combination of at least two continuous dither tones, each dither tone having a precisely determinable phase relationship sufficient for coherent processing of said each dither tone; and

detecting the dither tones to detect said channels, the step of detecting the dither tones comprising performing an FFT (Fast Fourier Transform) operation to detect dither tones of a channel having a relatively high power and performing coherent averaging of FFT results over a plurality of FFT operations, comprising an accumulation of the FFT amplitudes in accordance with said respective determinable phase relationships for successive FFT periods, to detect dither tones of a channel having a relatively low power.

2. **(original)** A method as claimed in claim 1 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel alternately, with a predetermined periodicity, with a respective one of two continuous dither tones.

3. **(original)** A method as claimed in claim 2 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

4. **(original)** A method as claimed in claim 1 wherein the step of modulating each channel to be identified with a respective combination of at least two continuous dither tones comprises modulating each channel with a respective one of at least three continuous dither tones with a cyclic repetition and a predetermined periodicity.

5. **(original)** A method as claimed in claim 1 wherein the multiplexed communications network comprises an optical WDM network and each channel comprises an optical channel.

6. **(original)** A method of identifying optical channels in an optical WDM network, comprising the steps of:

continuously generating dither tones at a plurality of frequencies; and

intensity modulating each of a plurality of optical channels to be identified with a respective selection of at least two of said dither tones in a cyclically repeated sequence and with a predetermined periodicity.

7. **(original)** A method as claimed in claim 6 wherein each optical channel to be identified is intensity modulated alternately with each of a respective two of said dither tones.

8. **(original)** A method as claimed in claim 7 and further comprising the step of detecting intensity modulation of at least one optical signal, detecting dither tones of the optical signal using an FFT (Fast Fourier Transform) operation, and performing coherent averaging of FFT results over a plurality of FFT operations.

9. **(original)** A method as claimed in claim 6 and further comprising the step of detecting intensity modulation of at least one optical signal, detecting dither tones of the optical signal using an FFT (Fast Fourier Transform) operation, and performing coherent averaging of FFT results over a plurality of FFT operations.

10. **(original)** A modulating arrangement comprising:

a plurality of continuous dither tone sources;

a selector for selecting at least two dither tones from said sources in a cyclically repeated sequence and with a predetermined periodicity;

a modulator for modulating a channel of a multiplexed communications network with the cyclically repeated sequence of dither tones from the selector; and

a feedback loop for maintaining a predetermined modulation depth of the channel by the modulator.

11. **(original)** A modulating arrangement as claimed in claim 10 wherein the selector is arranged for selecting alternately each of two dither tones from said sources.

12. **(original)** A modulating arrangement as claimed in claim 10 wherein the multiplexed communications network comprises an optical WDM network and the modulator comprises an optical modulator for intensity modulating an optical channel of the optical WDM network.

13. **(original)** A modulating arrangement as claimed in claim 12 wherein the selector is arranged for selecting alternately each of two dither tones from said sources.

14. **(original)** A detection arrangement for use in a multiplexed communications network including a modulating arrangement as claimed in claim 10, the detection arrangement comprising a detector for detecting the modulation by said modulator, an FFT (Fast Fourier Transform) operation for producing FFT results corresponding to said dither tones, and an arrangement for coherent averaging of the FFT results over a plurality of FFT operations.

15. **(original)** A detection arrangement as claimed in claim 14 wherein the detector comprises an optical detector for detecting intensity modulation of an optical signal in an optical WDM network.